Metacognitive improvement and symptom change in a 3-month treatment for borderline personality disorder

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Abstract

Objectives: Recognizing and reflecting on one's own and other people's mental states represents a major difficulty for patients with Borderline Personality Disorder (BPD). Only recently have studies begun exploring whether these capacities increase with successful therapies and if such an improvement is linked with outcome. The present study investigated whether metacognition would improve and if its improvement was related with symptom change in BPD patients.

Design: The transcripts from the first and the penultimate session of a ten-session version of good psychiatric management were analysed with the MAS-R scale in a $N = 37$ BPD sample. Patients, selected from a previously published RCT (Kramer et al., 2014), were assigned either to the good psychiatric management treatment or to the same treatment with the addition of the Motive-Oriented Therapeutic Relationship (MOTR; Caspar, 2007), a form of therapeutic relationship based on an individualized case formulation. Symptoms were assessed with the OQ-45.

Results: Findings partially support the hypotheses. First, improvement in capacities to understand others' mind, to take a critical distance from one's own rigid and maladaptive beliefs and to use behavioral and attentional strategies to face adversities is found in both treatment groups. Controlling for marital status, only the ability to differentiate between reality and representations remains significant. Second, no link between metacognitive change and symptom change during treatment is found. However, a link is observed between the increase in metacognition and symptom reduction at 6-month follow-up.

Conclusions: Results invite to further investigate the role of metacognition in therapy change through different modalities and in longer-term treatments.

Practitioner Points

- The development of metacognitive processes and their links with symptom change were examined during a short-term treatment in 37 borderline patients
- Improvement was found in capacities to understand others' mind, to take a critical distance from own rigid and maladaptive beliefs and to use behavioral and attentional strategies even in a short-term treatment
- Controlling for marital status, only the ability to take a critical distance from representations remained significant
- A link was observed between increase in metacognition and symptom reduction at 6-month follow-up
- Understanding and tailoring interventions to specific metacognitive difficulties could be associated with symptom change during treatment for BPD patients

Following early observations by Fonagy (1991) about people presenting with BPD having difficulties in thinking about thinking, many researchers have investigated and developed considerations in this field. This capacity has been labelled under different names, such as metacognition (Semerari et al., 2003), which is the term we will adopt henceforth, mentalizing (Bateman & Fonagy, 2004), theory of mind (Carruthers & Smith, 1996), or affect consciousness (Choi-Kain & Gunderson, 2008). Differences in terminology notwithstanding, the key concept is that people with BPD may present difficulties ranging from unawareness of their own feelings (Joyc, Fujiwara, Cristall, Ruddy, & Ogrodniczuk, 2013; McMain et al., 2013; New et al., 2012; Semerari et al., 2014) to problems in correctly inferring the feelings of others as well as their intentions, which underlines potential problems in facial affect recognition and theory of mind (Choi-Kain, Fitzmaurice, Zanarini, Laverdière, & Gunderson, 2009; Petersen, Brakoulias, & Langdon, 2016; Semerari et al., 2005; 2015). Furthermore, difficulties in forming an integrated representation of the self and of others in BPD patients has long been observed and found in studies using different methodologies (Kernberg, 1975; Levy, Beeney, Wasserman, & Clarkin, 2010; Outcalt et al., 2016; Semerari et al., 2014).

We thus argue that metacognitive impairments are associated with BPD symptoms and that metacognition could act as a mechanism of change (Kazdin, 2009; Kramer, 2017) and be responsible for a part of symptom change during therapy.

What is metacognition?

The terms metacognition and mentalization are used in reference to the system of understanding, reflecting upon and regulating mental states. Metacognition involves different functions: a) the understanding of one's own states of mind, b) the understanding of others' states of mind and c) how individuals use these representations in order to cope with suffering

and resolve psychological and interpersonal conflicts (Semerari et al., 2003). It has been operationalized with the Metacognition Assessment Scale-Revised (MAS-R; Carcione et al., 2010), used in the present study. Mentalization, for its part, is "the mental process by which an individual implicitly and explicitly interprets the actions of himself or herself and others as meaningful on the basis of intentional mental states such as personal desires, needs, feelings, beliefs, and reasons" (Bateman & Fonagy, 2004, p.21). This process has been operationalized with the Reflective Function scale (RF; Fonagy, Target, Steele, & Steele, 1998).

Metacognitive impairments and Borderline Personality Disorder

Reduced ability to make sense of mental states contributes to poor quality of interpersonal relationships and difficulties in forming a robust sense of identity and successfully pursuing long-term plans (Bateman & Fonagy, 2004; Lysaker et al., 2014; Semerari et al., 2003): if a a person has negative anticipations about the motives underlying other people's behavior, for example thinking the other is cheating or abandoning, and cannot question the truth-like quality of these attributions, it is hard to form secure relationships or to regulate the negative emotions evoked by such scenarios.

Problems in the ability to make sense of mental states could sustain BPD symptoms such as emotional dysregulation, impulsivity or self-harm (Bateman & Fonagy, 2004; Fonagy, Luyten, & Bateman, 2015; Semerari et al., 2014). Studies also identified that all areas of the metacognitive system may be impaired (Joyce et al., 2013; McMain et al., 2013; New et al., 2012). Moreover, the ability to form a mature and nuanced understanding of other people's mind is consistently impaired when analysed with tasks involving complex scenarios (Brüne et al., 2016; Outcalt et al., 2016), mirroring real life conditions (Sharp et al., 2016), or when analysing patient interviews and session transcripts (Levy et al., 2006; Semerari et al., 2005; 2015). Finally,

the ability to regulate mental states, including emotions, is also limited in this population (Carcione et al., 2011; Lysaker et al., 2014; Outcalt et al., 2016; Scott, Stepp, & Pilkonis, 2014).

Taking all these into account, difficulties in understanding and reflecting on mental states have been defined as an important treatment target for BPD population (Bateman & Fonagy, 2004; Dimaggio, Semerari, Carcione, Nicolò, & Procacci, 2007; Fonagy, Luyten, & Bateman, 2015).

Metacognition and psychotherapy outcome

As many symptoms and interpersonal problems presented by patients suffering from BPD are correlated with reduced metacognition, studies have focused on this relationship in two different ways: metacognition is either postulated as an outcome predictor or a moderator factor in BPD treatments.

As a possible outcome predictor, findings concerning the assumption that higher metacognitive abilities at treatment onset are associated with a more pronounced symptom reduction in BPD patients are still mixed. For example, alexithymia, the poor capacity to identify and describe one's own emotions (Talyor, Bagby, & Parker, 1997) was found to be an outcome predictor in Ogrodniczuk, Piper, and Joyce's (2011) study. However, this finding was not replicated by Joyce and colleagues (2013). Two studies showed rather a moderator effect of mentalization abilities on patients' outcome in terms of social functioning, symptom distress, interpersonal problems and psychosocial functioning. Gullestad, Johansen, Høglend, Karterud, and Wilberg (2013) found that patients with avoidant PD and/or BPD, and presenting a low level of reflective functioning at baseline, improved their psychosocial functioning when assigned to an outpatient treatment (individual therapy, flexible format) compared to a step-down treatment (day hospital treatment and outpatient group and individual therapies). They did not find a

predictor effect of reflective functioning on outcome. A 6-year follow-up on the same sample replicated the previous results, namely a moderator and no predictor effect of reflective functioning (Antonsen et al., 2016).

However, studies focused on predictor and moderator factors provide no deeper explanation on how change occurs during therapy. Indeed, the idea is that first patients come to understand in a deeper way their mental states and those of others, and then they use this capacity for the sake of symptom relief and behavioral change (Bateman & Fonagy, 2004; Semerari et al., 2007), change in metacognition being correlated with symptom reduction.

Fischer-Kern et al. (2015) compared BPD patients who received either transference-focused psychotherapy or a treatment by experienced community therapists. Changes in reflective functioning was negatively linked with changes in personality organization. Recently, De Meulemeester, Vansteelandt, Luyten, and Lowyck (2017) examined mentalization as a predictor and as a mechanism of change in a long-term hospitalization-based psychodynamic treatment for BPD patients. Levels of mentalization at onset did not predict symptom change but a strong correlation was observed between change in symptomatic distress and change in uncertainty about mental states.

In a pilot study, pre-post therapy session transcripts of 10 BPD patients were analysed with the MAS-R (Maillard et al., 2017). The findings, to be taken cautiously, showed significant improvement in the metacognition's mastery function and a link between the level of understanding of others' mind at the treatment onset and better outcomes after a short-term treatment.

Change in metacognition through psychotherapy

In the light of the above, we hypothesize that improvement in the capacity to make sense and regulate mental states might explain a part of good therapeutic outcomes. As therapy progresses, patients should learn how to better identify their emotions, their cognitions and question their attributions as well as to use psychological information for the sake of a more adaptive self-regulation (Carcione et al., 2011; Dimaggio et al., 2009; Kramer, 2016; Kramer, Keller, Caspar, de Roten, & Despland, 2017; Neacsiu, Rizvi, & Linehan, 2010; Semerari et al., 2005). In other words, good outcome psychotherapy should be likely to promote an increase in mentalistic capacities in different kinds of treatment (Carcione et al., 2011; Fischer-Kern et al., 2015; Levy et al., 2006).

Two previous RCTs explored the evolution in mentalization in BPD patients during 1 year of therapy. Levy et al. (2006) highlighted a significant improvement in reflective functioning, as assessed in adult attachment interviews (Fonagy, Target, Steele & Steele, 1998) for patients treated with transference-focused psychotherapy, whereas individuals assigned to dialectical behavior therapy and supportive therapy did not show such a change. A significant increase in mentalization was found only in patients treated with transference-focused therapy in Fischer-Kern et al. (2015). Other studies did not show evidence for such an improvement in mentalization, for example in a psychoanalytic treatment for hospitalized patients presenting with a PD (73% of whom belonged to cluster B; Vermote et al., 2010; 2011).

Change in short-term treatments

The majority of the studies focused on possible mentalistic improvement have analysed periods ranging from 4 months to years of therapy (Antonsen et al., 2016; Carcione et al., 2011; Fischer-Kern et al., 2015; Gullestad et al., 2013; Levy et al., 2006; Vermote et al., 2010; 2011).

The question remains open about how fast such an improvement can be achieved and little is known about very early metacognitive changes in psychotherapy, even if brief treatments have demonstrated effects on initial symptom relief. For example, Kramer et al. (2014) analysed the impact of the Motive-Oriented Therapeutic Relationship (MOTR; Caspar, 2007) in the context of a 10-session version of a general treatment for patients presenting with BPD. MOTR stems from the Plan Analysis (PA) method, which is an individualized case formulation inferred from the patients' verbal and non-verbal behaviors (for a detailed prototypical PA of BPD, see Berthoud et al., 2013). A therapeutic relationship, which is developped on the basis of the PA, is then offered to the patient. It was shown that MOTR had a small but significant effect on symptom reduction. Whether early therapeutic changes are possible is a question that has to be examined to get a better comprehension of the therapeutic levers playing a role in BPD treatments.

Goals and hypotheses of the present study

The present study aims at exploring the metacognitive change and its links with therapeutic outcome in a 10-session treatment, which is a condensed version of Good Psychiatric Management (GPM; Gunderson & Links, 2014). We want to explore whether early changes in metacognition appear in a treatment that does not specifically focus on its improvement. We also want to examine whether metacognitive change is linked with symptom change, even in such a short therapy period. The two main hypotheses for the present study are:

1. Metacognition improves during a short-term treatment
2. The increase in metacognition is correlated with symptom reduction, especially interpersonal difficulties

Method

Design

The present study represents a secondary process-outcome analysis based on a RCT (Kramer et al. 2014, $N = 85$), using a sub-sample of a process-outcome mediation analysis (Kramer et al., 2017, $N = 57$). The study was offered to each adult (between 18 and 65 years of age) addressed to a specialized center for borderline personality disorder, which was part of an outpatient university psychiatric clinic.

Patients were randomly allocated either to the manualized short-version of the GPM (GPM condition) or to the same treatment to which MOTR was added (GPM + MOTR condition). Randomization was executed with an internet-based block randomization program, and an independent researcher prepared sealed envelopes that were opened once the patient has accepted to participate to the study. The protocol was approved by the ethic board (clearance number 254/08) and by the research comittee of the university department. Moreover, the participants did not pay for their treatment, according to the national law. The drop-out rate was 13% (Kramer, 2014).

Participants

Twenty participants from the Kramer et al. (2017) study were excluded because either the tape recorded session was a structured assessment (diagnosis, suicidal risk, addiction) or for other exclusion criteria (presence of a translator or of co-morbid head injury).

Of the 37 remaining patients (all completers from Kramer et al. 2014), 17 belonged to the GPM condition and 20 to the GPM + MOTR condition (Table 1). At baseline, groups did not differ in terms of age ($t_{1,37} = -.016$, $p = .98$), gender ($\chi^2 = 2.2$, $p = .14$), employment ($\chi^2 = 3.9$, $p = .27$), number of BPD criteria ($t_{1,37} = -.08$, $p = .94$), number of diagnoses on axis I ($t_{1,37} = .11$, $p =$

.91) and II ($t_{1,37}$ = .36, p = .72), level of OQ-45 symptoms ($t_{1,37}$ = -.99, p = .33) and level of metacognition at intake ($t_{1,37}$ = 1.74, p = .09). Patients from the GPM + MOTR condition were more frequently married than the GPM group (χ^2 = 9.76, p < .05). Comorbid diagnoses were assessed by trained clinicians with the Mini International Neuropsychiatric Interview (Lecrubier et al., 1997) for DSM-IV axis I and the SCID-II (First & Gibbon, 2004) for DSM-IV axis II. On average, patients had 7.08 (*SD* = 1.5) BPD criteria.

Therapists

A total of 10 therapists were in charge of the GPM-based treatment in the GPM condition: 3 therapists treated respectively 5, 3, and 2 patients, and 7 therapists treated 1 patient. For the GPM + MOTR condition, 5 therapists treated respectively 8, 6, 3, 2, and 1 patients. They were 6 psychiatrists and 6 psychologists with at least 1 year of psychiatry residency and a basic psychodynamic background. 3 therapists were nurses.

Treatments

GPM condition: Patients received a 10-session treatment which constitutes a short version (Kolly et al., unpublished) of the GPM for BPD (Gunderson & Links, 2014). The majority of patients received additional treatment after the 10 sessions. GPM was used as a useful first-line treatment and a preparation for long-term psychotherapy. It focuses on: communication about psychiatric diagnoses, comorbidities and psychiatric anamnesis, definition of the main problems and treatment targets, identification of treatment objectives, recognition of and dealing with difficulties interfering with the treatment and finally formulation of the relational interpretations of core conflictual themes.

GPM + MOTR condition: This condition is the same as the GPM, with the implementation of Plan Analysis (PA), an integrative case formulation method, and MOTR

techniques that are intervention heuristics consistent with the patients' PA (Caspar, 2007). Based on PA, the therapist individualizes the therapeutic relationship he offers, and MOTR enables the satisfaction of the patient's needs in the therapy (in the limits of the therapeutic relationship) without reinforcing problematic behaviors generally used by the patient. Using MOTR, the therapist thus ensures a setting in which the patient does not need to use his/her problematic means to reach his/her motives or needs.

Treatment adherence: Treatment adherence for GPM was assessed with the General Psychiatric Management Adherence Scale (Kolla et al., 2009), filled by therapists after treatment. Treatment integrity was high for the GPM condition (M = 4.32, SD = 0.3) and for the GPM + MOTR condition (M = 4.37, SD = .26). Inter-group difference was not significant ($t_{1,38}$ = .58, p = .57).

Treatment adherence for the MOTR was measured with the observer-rated method of Plan Analysis and the Motive-Oriented Therapeutic Relationship scale (Caspar, Grossman, Unmussig, & Schramm, 2005). It is based on the accuracy of the therapist concerning the patient's PA. Results showed a strong MOTR adherence in the GPM + MOTR condition (M = 1.55, SD = .04) and a moderate MOTR adherence for the GPM condition (M = 0.45, SD = .38). This difference was significant ($t_{1,59}$ = 10.62, p<.001).

Instruments

The Outcome Questionnaire-45.2 (OQ-45; Lambert et al., 2004) is a self-report questionnaire designed for assessing three domains of mental health functioning and their evolution during treatment: symptom distress, interpersonal functioning and social role. Items are assessed on a 4-point Likert scale, ranging from 1 (never) to 4 (always). A global score and scores for each subscale are computed. The cut-off for the global score is 63, 36 for symptom

distress, 15 for interpersonal relationships and 12 for social role. The questionaire was given after the first and the penultimate sessions and was filled in between two sessions, at home. Cronbach's alpha was $\alpha = .94$ for the present study and $\alpha = 0.94$ in the literature (Boswell, White, Sims, Harrist, and Romans, 2013).

The Metacognition Assessment Scale-Revised (MAS-R; Carcione et al., 2010) is an observer-rating scale that assesses change in metacognitive capacities as manifested in individuals' narratives. It provides a global score and a score for three main subscales with several subfunctions:

1) Understanding of one's own Mind (UM subscale) measures the ability of a person to think about his own mental states. It includes 1) *Monitoring*, that is the ability to recognize and describe cognitive and emotional states and the links between them; 2) *Differentiation* which is the distinction between reality and representations; 3) *Integration*, which is the ability to construct an integrated view of the self.
2) Understanding of Other's Mind (UOM subscale) assesses the capacity to think about others' mental states. It includes 1) *Monitoring*, that is the identification of other's cognitions, emotions and the possible links between them and other's behavior; 2) *Decentration*, or the possibility to hypothesize about other's states of mind which are independent from our own point of view or our involvement in the relationship.
3) Mastery (M subscale) represents the adoption of an active attitude to use mentalistic knowledge to soothe suffering and solve conflicts. It includes three different levels, from a more behavioral to a more metacognitive level.

Each subfunction is rated on a 5-point Likert scale ranging from 1 = "scarce" (sporadic, poorly articulated, not spontaneous, probing does not generate improvement) to 5 =

"sophisticated" (sustained talk about mental states, descriptions are rich, talk of mental states is spontaneous or there is an autonomous elaboration of a question/suggestion). If a subfunction does not appear in the transcript, the rater has the possibility to score it as "Not Engaged".

Cronbach's alpha was $\alpha = .94$ for the present study and .91 for the pilot study (Maillard et al., 2017).

Procedure

The first and penultimate sessions of each of the 37 patients were tape-recorded and transcribed (Mergenthaler & Stigler, 1997). The therapist was in charge of the recordings. Data treatment and storage were done according to standard ethical procedures, accepted by the ethic board. Thus, a total of 74 transcripts were analysed with the MAS-R.

MAS-R assessment and rating

Each transcript was split into interaction units, and two independent raters, along with a Master's degree student, scored each unit with the MAS-R. All were blinded to the treatment condition. One rater is one of the developers of the MAS-R and another is a psychologist with 5 years of clinical and research experience who was trained for 6 months in the MAS-R scoring. They were all blind to any details regarding participants and sessions. A consensus score was then used for the data collection.

Statistical analyses

Inter-rater reliability was analysed using Intra-Class Coefficients (Shrout & Fleiss, 1979). Pearson's correlations were used between the MAS-R subscales to observe the links between them. Paired t-tests were conducted to assess the potential differences between the scoring units of the MAS-R. Finally, independent t-tests were done to test the symptom change, and Pearson's

correlations between the OQ-45 and the MAS-R scores at intake were used to observe the relationship between symptoms and metacognition at treatment onset.

For the first hypothesis, repeated measures analyses of variance (rm ANOVA) were conducted to analyse intra and inter-group differences between MAS-R subscales at intake and at discharge. Marital status was added as a co-variate variable in repeated measures analyses of covariance (rm ANCOVA).

For the second hypothesis, the link between metacognitive and symptom changes, Pearson's partial correlations were used on the delta scores of OQ-45 and MAS-R. These scores were obtained by subtracting scores at discharge from scores at intake. Scores at intake were entered as controlled variables. Analog analyses were carried out on outcome defined as symptom change between discharge and 6-month follow-up.

Both hypotheses were tested on the full sample taking into account the relevant covariants. For exploratory purposes, each condition (GPM and GPM + MOTR) was also analysed separately. For that point, an analysis of covariance (ANCOVA) and Pearson's partial correlations, followed by Fisher's *z* transformation, were compared to explore possible inter-group differences.

Results

Preliminary Analyses

First, inter-rater reliability of the MAS-R was calculated for 20% of the transcripts (n = 15) with Intra-Class Coefficients. It was considered good, with a mean ICC (2,1) = .81 (SD = .17, range = .65-.96). Second, the relationship between the three subscales of the MAS-R (UM, UOM, M) was analysed for all patients (N = 37) and significant Pearson's correlations were found at intake: UM correlates with UOM (r =.73, p <.001), and with M (r = .84, p <.001), and

UOM correlates with M (r = .73, p <.001). Significant correlations were also found at discharge: UM correlates with UOM (r =.85, p <.001), and with M (r = .89, p <.001), and UOM correlates with M (r = .75, p <.001). Third, paired t-tests were conducted to assess the differences between the scoring units (part 1, 2 and 3 of each session) of the MAS-R. No significant difference was found (t range = .03 - 1.94, all *NS*). Fourth, change in OQ-45 was analysed for the entire sample by comparing global scores at intake and at discharge. Globally, patients showed a significant decrease in symptoms: *M* at intake = 98.5, *SD* = 26.4, and *M* at discharge = 83.1, *SD* = 25.4 (t = 4.47; p <.001). The GPM group did not statistically improve in terms of symptoms (intake: *M* = 93.8, *SD* = 28; discharge: *M* = 84.8, *SD* = 27; t = 1.61, p =.12). However, the GPM + MOTR group did improve significantly (intake: *M* = 102.4, *SD* = 24.8; discharge: *M* = 81.7, *SD* = 23.9; t = 5.25, p <.001). Finally, links between OQ-45 and MAS-R at intake were analysed with Pearson's correlations. A negative correlation was found between OQ-45 total score and MAS-R total score (r = -.301, p = .03).

Metacognitive change during treatment

The first hypothesis was that metacognition improves during treatment. Means and standard deviations for the MAS-R global and subscales scores at intake and at discharge are presented in Table 2. Rm ANOVA were first conducted to test the difference between the MAS-R scores at intake and at discharge for both groups. We found significant improvement for the main subscale Understanding of Other's Mind (UOM): F(1,34) = 6.02, p = .02, ES pre-post d = 0.53 (GPM d = 0.49; MOTR d = 0.57). Analyses were also made at the subfunction level and revealed significant improvement for the UOM subfunction *Monitoring*: F(1,34) = 7.75, p = .009, ES pre-post d = 0.60 (GPM d = 0.56; MOTR d = 1.19), for the Understanding one's own Mind subfunction *Differentiation:* F(1,32) = 6.96, p = .013, ES pre-post d = 0.62 (GPM d = 0.51;

MOTR d = 0.73) and the Mastery subfunction *Second level strategies*: F(1,15) = 4.49, p = .05, ES pre-post d = 0.62 (GPM d = 0.58; MOTR d = 0.71).

Rm ANCOVA were then used with marital status as covariate variable. Only the change for the UM subscale *Differentiation* remained significant: F(1,31) = 4.48, p = .04, d = 0.62 (Table 2); married patients showed a greater change in terms of metacognition compared to single or divorced patients. No difference between GPM and GPM + MOTR groups was found for *Differentiation* change across treatment: F(1,31) = .294, p = .59. We made additional analyses to control that there were no difference at intake between married and single/divorced patients on the OQ-45: independent t-tests were non-significant: F(1,35) = .81, p = .75, d = 0.08.

Metacognitive and symptom changes

Our second hypothesis was that the greater the metacognitive increase, the greater the symptom reduction. First, MAS-R change and OQ-45 were computed in delta MAS-R score and delta OQ-45 score. Pearson's partial correlations were then conducted to explore the gradient between metacognitive change and symptom change, controlling for MAS-R and OQ-45 scores at intake. No significant partial correlation was found (Table 3). As for our first hypothesis, we explored the differences between the GPM and the GPM + MOTR groups concerning the link between metacognitive and symptom changes. No partial correlation was significant between delta MAS-R and delta OQ-45 when both groups were compared (transformed z range = -0.42-1.25, M = 0.50, SD = 0.57).

Finally, Pearson's partial correlations were conducted between delta MAS-R and symptom change during the 6-month follow-up (OQ-45 score at 6-month follow-up – OQ-45 score at discharge), controlling for MAS-R score at intake and OQ-45 score at discharge. Analyses were made on n = 20 participants (8 were part of the GPM group and 12 of the GPM +

MOTR group), due to missing values at follow-up (Kramer, Stulz et al., 2017). A negative correlation was found between delta MAS-R and delta OQ-45: r = -.403, p = .049, suggesting that the greater the MAS-R improvement during treatment, the greater the symptom reduction during follow-up. Identical analyses were made on the OQ-45 subscales. They revealed a negative correlation between delta MAS-R and the Interpersonal Relationships subscale (r = -.489, p =.02).

Discussion

In the present study, we first hypothesized an increase in the ability to recognize mental states in the self and in others, to form complex and integrated ideas of the self and others, and to use mentalistic knowledge for a purposeful problem solving in a short-term treatment for BPD. The second hypothesis was that the metacognitive improvement was linked to symptom change presented by patients. Two main results were found. First, using a strict and controlled model, we highlighted that married borderline patients show a greater improvement in terms of metacognition, compared to single or divorced patients. Secondly, links were found between metacognitive change during treatment and symptom reduction during the 6-month follow-up period.

Change in metacognition

Including the marital status as a covariate variable, we found a significative change for the *Differentiation* variable. This is an important point for the understanding of the therapy process, particularly with BPD patients, as it involves the capacity to consider one's own thoughts as hypotheses and not necessarily as mirroring reality. Indeed, BPD patients tend to show overconfidence in their conclusions, especially when they assign negative intentions to other people (Baer et al., 2012; Barnow et al., 2009). The treatment used in the present study

seems to have been helpful to reduce such biases and promote the capacity to self-observe from a different perspective. Of note, given that differentiation remained low at therapy outset, it is likely that the change obtained was simple, e.g. patients just passed to ideas such as: “Others will abandon me for sure as they are mean to me” to “Maybe I am over-concerned about abandonment”. Furthermore, the marital status seems to represent a moderator variable of our results. Indeed, married patients showed a greater *Differentiation* change compared to single or divorced patients. It is possible that the relationship and the daily life shared with a partner promotes, as the therapeutic setting, a distanciation regarding patients’ hypotheses and representations, not forgetting of the impact of satisfaction and support associated with marriage on mental health (Holt-Lunstad, Birmingham, & Jones, 2008).

In a less controlled pattern of analyses, a significant increase in the ability to understand other people’s mental states (UOM) was also found, independent of treatment group. As treatment was not devised to promote awareness of others’ states of mind, it is possible that this improvement was driven by non-specific factors, such as a good therapy relationship. But treatment may also have promoted an initial correction of BPD biases, such as over-attribution of hostility in the others and mistrust (Baer, Peters, Eisenlohr-Moul, Geiger, & Sauer, 2012; Hidalgo et al., 2016). Moreover, two MAS-R subscales improved: the identification of other’s cognitions and emotions (UOM *Monitoring*) and the ability to deal with difficulties imposing or inhibiting a behavior on oneself or using a distraction (*Second level strategies*).

Metacognition as a mechanism of change

Regarding metacognition as a possible mechanism of change during treatment**,** results were not conclusive: metacognitive change was not linked with symptom reduction. Again, this may be specific to the treatment adopted here, as symptom change may have been obtained by

psychoeducational aspects that patients learnt and which helped them to better deal with crises. Moreover, symptom change was relatively small and did not result in better and healthier interpersonal functioning. It is still possible that with more time an increase in metacognition may predict symptom change in the long term, especially in the area of social relationships.

Of course, we cannot rule out the hypothesis that overall metacognition simply does not act as a mechanism of change, as our main finding nuances De Meulemeester et al.'s (2017) study where a strong association was found between improvement in mentalizing and symptom change during treatment. Part of that difference could be explained by the nature of the method used, in addition to conceptual divergence of how the potential mechanism of change was defined. Indeed, while self-questionnaires were used in the De Meulemeester et al. (2017) study, an observer-rating scale was adopted here. We presume that it provides a different evaluation of metacognition than self-questionnaires and the biases they involve. It follows Kramer (2017) who notifies, in order to be clinically meaningful, that the process perspective on personality disorder should ideally emphasize the use of an independent observer's viewpoint through the use of video or audio transcripts of therapeutic sessions to understand therapy change in personality disorders.

Though metacognitive improvement was not related to symptom change through the 10-session treatment, it was linked with the symptom change that took place during the 6-month follow-up period. This medium-term effect may mean that through treatment and relationship with their therapists, patients have learnt to reflect on their mental states and those of others', and time was needed to integrate those new aspects and to potentiate a reduction of interpersonal difficulties, as experienced by patients. This finding highlights the close connection between metacognitive capacities and interpersonal issues presenting by patients suffering from BPD.

The present study has several limitations. First of all, our sample was composed of 70% of women, which reduces the generalizability of the results. Moreover, our sample was a very low functioning one, therefore replication is needed with higher functioning population and a control group. Furthermore, high correlations were found between the three MAS-R subscales at intake and at discharge. This raises the issue of whether the use of the MAS-R global score only was the best way to assess metacognition in our sample. A measurement of alexithymia could also be added in the protocol in order to enrich the assessment of metacognitive domains. Of note, metacognition capacities do not only rely on patients but also depend strongly on the therapist's ability to adapt his/her own metacognitive level to the patient's in order to improve and develop it (Bateman & Fonagy, 2006; Dimaggio et al, 2015). As therapists' interventions and their responsiveness to metacognitive problems were not assessed, we cannot rule out the possibility of therapist contribution to our findings. Another limitation is that 15 therapists delivered treatment, which brings the possibility of a large variability in the quality of therapies administered. Further exploration of the role of the therapists is thus needed. Finally, our results speak for a very specific treatment model for BPD, which was not tailored to promote awareness of mental states. Therefore, results cannot be generalized to patients undergoing other treatments.

In spite of the acknowledged limitations, this study expands results from a recent pilot study (Maillard et al., 2017) and provides evidence that some metacognitive aspects can improve during psychotherapy for BPD, even in a period as short as 3 months (see Edel et al. 2017 for parallel findings). Conversely, the magnitude of metacognitive change was quite small and specific to selected aspects of metacognition. Future research should continue to investigate other therapy modalities and use longer-term treatments in order to explore if metacognition evolves during successful therapies. Overall, there is the promise that tailoring interventions to

specific metacognitive impairments, which implies a high degree of therapist responsiveness, metacognition would improve more and be more strongly connected to symptom change. Research is also needed to explore whether metacognition acts through its impact on the therapy relationship, as patients having less mentalistic capacities are likely to have more difficulties forming a task-oriented alliance with their therapists, this last issue being the next goal of our research program.

The authors report no conflicts of interest.

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Table 1

Patients' characteristics at intake (N = 37)

	Group	
Variables	**GPM (*n* = 17)**	**GPM + MOTR (*n* =20)**
Age	33.7 (1.18)	33.8 (1.4)
Gender		
Female	14 (82.4)	12 (60)
Marital Status		
Single	11 (64.7)	3 (15)
Married	3 (17.6)	10 (50)
Divorced	3 (17.6)	7 (35)
Employment		
Unemployed	15 (88.2)	12 (60)
Protected activity	0 (0)	1 (5)
Part-time	1 (5.9)	3 (15)
Full-time	1 (5.9)	4 (20)
Medication		
Yes	16 (94)	14 (70)
DSM-IV axis I diagnoses		
Depressive disorder[1]	10 (58.8)	17 (85)
Substance abuse	9 (52.9)	5 (25)
Anxiety disorder[2]	5 (29)	4 (20)
Eating disorder	0 (0)	3 (17.6)
Attention deficit	1 (5.9)	0 (0)
Sexual disorder	1 (5.9)	0 (0)
DSM-IV axis II diagnoses		
Cluster A	3 (17.6)	3 (15)

Cluster B	4 (23.5)	2 (10)
Cluster C	2 (11.8)	4 (20)
Fulfilled BPD criteria	7.06 (1.48)	7.10 (1.59)

Values are expressed as numbers (percentages in parentheses) or as means and SD.

[1] Including chronic depression and dysthymia

[2] Including generalized anxiety disorder, post-traumatic stress disorder, panic disorder with agoraphobia and social phobia

Table 2

Means, standard deviations, and change of MAS-R scores obtained by patients at admission and at discharge (N =37)

MAS-R scales	Admission mean (SD)	Discharge mean (SD)	F[1]	*p* value	ES
MAS-R total score	1.65 (0.47)	1.81 (0.52)	.73	.39	0.32
Understanding of one's own mind	1.81 (0.54)	2 (0.60)	1.26	.26	0.33
Monitoring	2.1 (0.67)	2.25 (0.72)	.49	.49	0.21
Differentiation	1.32 (0.49)	1.66 (0.60)	4.47	.043	0.62
Integration	1.41 (0.54)	1.60 (0.54)	2.09	.16	0.35
Understanding of Other's mind	1.40 (0.43)	1.65 (0.50)	2.36	.13	0.53
Monitoring	1.42 (0.45)	1.74 (0.60)	2.62	.12	0.60
Decentration	1.33 (0.56)	1.37 (0.45)	.12	.73	0.07
Mastery (M)	1.59 (0.50)	1.65 (0.50)	0	.99	0.12
Basic requirements	1.82 (0.72)	1.87 (0.62)	.01	.93	0.07
1st level strategies	1.54 (0.44)	1.54 (0.50)	.35	.56	0
2nd level strategies	1.57 (0.52)	1.95 (0.69)	.55	.48	0.62
3rd level strategies	1.59 (0.65)	1.60 (0.60)	.08	.77	0.01

[1]*df* for MAS-R total score = 1,34; Understandinf of one's own mind = 1,34; UM Monitoring = 1,34; Differentiation = 1,31, Integration = 1,30; Understanding of Other's mind = 1,33; UOM Monitoring = 1,33; Decentration = 1,28; Basic requirements = 1,34; 1st level strategies =1,33; 2nd level strategies = 1,14; 3rd level strategies = 1,26.

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Table 3

Pearson's partial correlations (r) of metacognition change (delta MAS-R) and symptom change (delta OQ-45 subscales)(N = 37)

	Symptom Distress	Interpersonal Relationships	Social Relationships
UOM	.046	.096	-.092
Differentiation	-.048	.153	.088
UOM Monitoring	.031	.302	-.083
Second level strategies	-.263	-.428	-.206

Deltas = deltas between pre and post measures